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EXAMINER
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TUROC, DAVID P

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1792

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/611,745  
Filing Date: June 30, 2003  
Appellant(s): HARDWICKE ET AL.

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Patrick Patnode  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 8/4/2008 appealing from the Office action mailed 1/16/2008.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

6234755	Bunker et al.	05-2001
6,060,174	Sabol et al.	05-2000

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-5, 10-20, 23, 24 and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Bunker et al. (US Patent No. 6,234,755).

Claim 1, Bunker et al. discloses a method for forming a flow director (by forming a slot over the holes) on a component comprising a wall, depositing at least one layer on the wall of the component wherein the deposition includes shaping the layer(s) in accordance with the predetermined shape of the slots and therefore forming the flow director (wall of slot) the formed layer extends radially ( $\sim 90^\circ$  from wall) outwards from the initial wall of the component and into a hot gas flow path (65) (column 2 lines 20-24, lines 50-60, figure 3). Bunker et al. discloses the coolant is directed from the film-cooling hole towards the hot surface of the wall, see arrows of coolant flow in figure 3. (Figure 3, Column 4, lines 15-22). The flow director (wall of slot) fails to extend over the exit site of the film-cooling hole that extends through the wall (see figures). The examiner notes that there are two walls to the slot and therefore there is a plurality of discrete flow directors for each slot and one of the flow directors is associated with one of the film cooling holes (Figures). Additionally, the examiner notes that Bunker discloses forming a slot over a row of holes and discloses multiple rows of holes and therefore teaches multiple slots, each over the multitude row of holes (Column 2, lines 45-50). Additionally, the examiner notes that the flow directors are formed external to

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the film cooling hole as discussed in section 2 above which is incorporated by reference in its entirety.

Claim 2, Bunker et al. discloses that the deposition comprises depositing a plurality of layers (column 2 lines 61-67) and shaping the layers using a mask to form the flow director, the slot (column 2 lines 50-60).

Claim 3, Bunker et al. discloses the wall has a cold surface and a hot surface (column 4 lines 15-20) with holes extending through the wall for flowing a coolant from the cold surface to the hot surface, and the deposition comprises depositing the layer(s) on the hot surface wall (column 4 lines 5-30, column 5 lines 47-67).

Claim 4, the flow director (the slot) comprises a method of directing the coolant flowing out of the exit site and towards the hot surface of the wall (column 2 lines 13-24) thus the coating acts to form the slot and modifies the flow of the coolant gas.

Claim 5, the flow director comprises a ridge extending along at least a portion of the exit site and further extending to a position downstream of the exit site (figure 4).

Claim 10, the deposition can be more than one layer thus it is formed a plurality of times (column 2 lines 61-67) and is done on more than one hole thus it is formed on a plurality of positions and forms a plurality of flow directors on the wall of the component (column 4 lines 63-54).

Claims 11, 12 and 13 one layer can comprise a metal while another layer comprises a ceramic (column 2 lines 61-67).

Claim 14, the component can comprise a secondary coolant slot (figure 6) in the substrate and this is enhanced by the flow director (the film on top of the slot) as this

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film makes the slot have a deeper depth and thus enhances the secondary coolant flow (column 9 lines 59-67).

Claim 15 the deposition can be done using CVD or PVD (column 5 lines 47-67).

Claim 16, Bunker et al. discloses that there is a masking step (column 2 lines 50-60).

Claim 17, all the features of this claim have been discussed above except that the part is a turbine component, which is disclosed in column 2 lines 13-24.

Claim 18, Bunker et al. discloses forming a plurality of layers on the wall and shaping the layers in a predetermined shape to form the flow director (column 2 lines 50-60).

Claims 19, 20 and 23 these claims have been described previously above.

Claim 24, Bunker et al. discloses that the protective coating is formed on the hot gas path surface of the component (column 2 lines 40-45).

Claim 27, the wall has four sides and can broadly be classified as a polygonal.

Claims 1-5, 10-20, 23, 24 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bunker et al.

Bunker teaches all that is discussed in the 35 USC 102(b) rejection above. While the examiner maintains the position that Bunker discloses multiple flow directors as discussed in the 35 USC 102(b) rejection above, Bunker discloses providing a slot on a high temperature surface to provide more effective cooling for a row of cooling holes. Additionally, Bunker discloses providing multiple rows of cooling holes and therefore it

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would have been obvious to one of ordinary skill in the art to have provided multiple slots, one over each of a multiple row of cooling holes, with a reasonable expectation of successfully providing effective cooling of the high temperature substrate.

Claims 6-9, 21 and 22 rejected under 35 U.S.C. 103(a) as being unpatentable over Bunker et al. in view of Sabol et al. (US Patent No. 6,060,174).

Claims 6 and 21, Bunker et al. discloses all of the features of the claims as discussed above except the reference does not disclose delivering a mixture through a nozzle onto the wall to form the layer wherein the mixture comprises a powder dispersed in a liquid medium. However, Sabol et al. teaches that when applying a MCrAlY film it can be applied as a powder slurry in a liquid medium using a slurry spray and that this technique is less expensive (column 3 lines 11-49). Accordingly it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Bunker et al. to use a slurry spray to apply the MCrAlY coating as suggested by Sabol et al. as this method is less expensive.

Claims 7 and 22, the part is a turbine engine part and the layer will be heated upon use of the part.

Claim 8, the nozzle must be displaced relative to the wall in order to spray coat the entire surface this would be done in accordance with the shape of the wall.

Claim 9, the spraying would obviously be controlled so that the wall is coated and not other parts that are not supposed to be coated this would be done in accordance with the shape of the wall.

## **(10) Response to Argument**

### Ground of Rejection No. 1

The appellant argues against the Bunker fails to disclose a plurality of discrete flow directors, wherein at least one of the flow directors is associated with respective one of the at least one film cooling hole. Further the appellant argues that Bunker discloses a continuous slot over the holes. The examiner respectfully disagrees. Specifically, the examiner maintains the position that two walls of the slot are a plurality of flow directors and can broadly be considered to be “associated” with each of a plurality of the film cooling holes. Nothing in the claim requires the flow director is only associated with a single film cooling hole.

The examiner notes that the arguments erroneously quote the claim language for both claim 1 and claim 17, where the claims fail to require “is associate with each of the at least one film cooling hole”. Specifically, the claims that are currently pending require “is associated with respective one of the at least one film cooling hole”. Therefore, as discussed above, the examiner notes that the claim only requires that the each of the plurality of flow directors is associated with the respective one of the film cooling hole, and the examiner maintains such is explicitly taught by Bunker, see for example figures.

Additionally, the examiner maintains that the arguments are not commensurate in scope with the claims because the claims fail to require that the discrete flow directors is associate with each of the at least one film cooling hole. Even in the event that the claims were deemed to require a slot associated with each of the claimed cooling holes.



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The examiner notes that the claims require comprising language, and Bunker discloses multiple slots, each with a multitude of film cooling holes, see column 2, lines 45-50 for example. The claims require at least one flow director and at least one film cooling hole, where the flow director is associated with the film cooling hole. Since the claim includes comprising language, the claims are open to other limitations that are not presently claimed. Therefore, since Bunker reasonably discloses two holes each with a flow director (wall of slot), the reference discloses at least one of the flow directors is associated with the respective one of the at least one film cooling hole. In other words, the fact that the reference discloses a flow director associated with more than one hole is moot because the claims only require that the flow director is associated with at least one cooling hole.

The appellant appears to be requiring that each of a plurality of holes has discrete flow director; however, such is not required by the claim. Specifically, the claim only requires that "at least one of the flow directors is associated with respective one of the at least one film cooling hole." Therefore the claim only requires that one flow director is associated with one film cooling hole and it is moot if the flow director is associated with multiple holes. Additionally, the examiner notes that Bunker discloses providing a slot on a high temperature surface to provide more effective cooling for a row of cooling holes. Additionally, Bunker discloses providing multiple rows of cooling holes and therefore it would have been obvious to one of ordinary skill in the art to have provided multiple slots, one over each of a multiple row of cooling holes, with a

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reasonable expectation of successfully providing effective cooling of the high temperature substrate.

In response to the appellants arguments relating to the Bunker reference disclosing a flow director that extends inward and is a depression on the surface and thus can not be considered a three dimensional projection. The appellant argues that Bunker fails to disclose forming a flow director that is three dimensional projection disposed external to the cooling hole and having limited dimensions in three directions. The examiner respectfully disagrees. It is unclear how Bunker fails to disclose as argued. Specifically, the claims require that the directors are projection disposed external to the cooling hole. The flow directors as taught by Bunker are reasonably interpreted to be projection from the cooling holes, i.e. extending outward therefrom, and therefore the examiner maintains that Bunker reasonably discloses such a limitation. Again it appears as though the appellant is narrowly reading the claim to require limitations that are not present in the pending claims. The slot forms walls, each of which is external to the cooling hole and must necessarily have limited dimensions in three directions, otherwise the dimension would be infinity, which is not the case in Bunker because the coating with the cooling holes has limited dimensions.

#### Ground of Rejection No. 2

The appellant argues against the Bunker fails to disclose a plurality of discrete flow directors, wherein at least one of the flow directors is associated with respective one of the at least one film cooling hole. Further the appellant argues that Bunker discloses a continuous slot over the holes. The examiner respectfully disagrees.

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Specifically, the examiner maintains the position that two walls of the slot are a plurality of flow directors and can broadly be considered to be “associated” with each of a plurality of the film cooling holes. Nothing in the claim requires the flow director is only associated with a single film cooling hole.

The examiner notes that the arguments erroneously quote the claim language for both claim 1 and claim 17, where the claims fail to require “is associate with each of the at least one film cooling hole”. Specifically, the claims that are currently pending require “is associated with respective one of the at least one film cooling hole”. Therefore, as discussed above, the examiner notes that the claim only requires that the each of the plurality of flow directors is associated with the respective one of the film cooling hole, and the examiner maintains such is explicitly taught by Bunker, see for example figures.

Additionally, the examiner maintains that the arguments are not commensurate in scope with the claims because the claims fail to require that the discrete flow directors is associate with each of the at least one film cooling hole. Even in the event that the claims were deemed to require a slot associated with each of the claimed cooling holes. The examiner notes that the claims require comprising language, and Bunker discloses multiple slots, each with a multitude of film cooling homes, see column 2, lines 45-50 for example. The claims require at least one flow director and at least one film cooling hole, where the flow director is associated with the film cooling hole. Since the claim includes comprising language, the claims are open to other limitations that are not presently claimed. Therefore, since Bunker reasonably discloses two holes each with a flow director (wall of slot), the reference discloses at least one of the flow directors is

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associated with the respective one of the at least one film cooling hole. In other words, the fact that the reference discloses a flow director associated with more than one hole is moot because the claims only require that the flow director is associated with at least one cooling hole.

The appellant appears to be requiring that each of a plurality of holes has discrete flow director; however, such is not required by the claim. Specifically, the claim only requires that "at least one of the flow directors is associated with respective one of the at least one film cooling hole." Therefore the claim only requires that one flow director is associated with one film cooling hole and it is moot if the flow director is associated with multiple holes. Additionally, the examiner notes that Bunker discloses providing a slot on a high temperature surface to provide more effective cooling for a row of cooling holes. Additionally, Bunker discloses providing multiple rows of cooling holes and therefore it would have been obvious to one of ordinary skill in the art to have provided multiple slots, one over each of a multiple row of cooling holes, with a reasonable expectation of successfully providing effective cooling of the high temperature substrate.

Ground of Rejection No. 3

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The examiner maintains the rejection for substantially the same reasons as set forth above in the Response to Arguments section Ground of Rejection No. 1 and Ground of Rejection No. 2.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

David Turocy

/David Turocy/

Patent Examiner, Art Unit 1792

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/Timothy H Meeks/

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